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Trofimovich, P., & McDonough, K. (Eds, 2011). *Applying Priming Methods to L2 Learning, Teaching and Research: Insights from Psycholinguistics*. Amsterdam/Philadelphia: John Benjamins.

Trofimovich and McDonough, and their collaborators, integrate a body of research furthering our understanding of the psycholinguistic bases of language learning and teaching. Uniquely, priming is the principle experimental methodology used to explore second language (L2) acquisition (e.g., the structure of the L2 lexicon), learners' understanding of L2 (e.g., listening comprehension), and L2 production (e.g., the use of particular L2 syntactic structures). PRIMING refers to the facilitation (and inhibition) of behavioural responses (e.g., response times) to a stimulus (target) as a result of prior experience with another stimulus in some way similar or related to it. In the L2 learning context, priming paradigms can be used to reveal the impact of the structure of L2 learning material on learners' subsequent mastery of (aspects of) L2. We can ascertain the nature of the L2 spoken (phonological) lexicon (using auditory priming), the structure and ease of accessibility of the L2 semantic lexicon (using semantic priming), and the L2 learners' acquisition of L2 syntactic structures (using syntactic (structural) priming).

The research presented articulates why priming methodology can provide valuable insights into L2 comprehension and production in learners at different stages of acquisition, and how the findings are relevant to the teaching of L2 in classroom settings. The book links theory and application in L2 learning and teaching, and is therefore relevant both to readers focused on theory and to those interested in the more applied and pedagogical aspects of L2 learning and teaching. Researchers (graduate students included) will draw inspiration from the application of priming methodology in this arena, while L2 teachers will find this volume an accessible, evidence-based resource for best L2 teaching practice and learning outcomes.

The book comprises an introductory and a concluding chapter, bookending two parts. Trofimovich and McDonough briefly introduce priming methodology and outline the book's structure (Chapter 1). Part I (Chapters 2-6) centres on priming methods in L2 learning research with primary L2 learning and teaching implications as its primary focus. Part II (Chapters 7-10) shares this focus but centres on innovative methodological approaches, i.e., novel applications of priming and related paradigms. All contributions include comprehensive discussions of relevant theory; several chapters also include details of testing materials. The final chapter concludes with suggestions for future research.

In Part I, variations of semantic, auditory, and syntactic priming are applied to a gamut of L2 learning and teaching questions. Using semantic priming, Altarriba and

Knickerbocker (Chapter 2) compare three methods of teaching L2 vocabulary; via direct translations, colour pictures, and black-and-white pictures. L2 learners of Spanish learned new vocabulary paired with words, colour pictures or black-and-white pictures. In a cross-linguistic priming task Spanish words (primes) preceded English word or nonword targets, and a LEXICAL DECISION had to be made (i.e., is the target letterstring a word or not?). Primes and targets were either related or not. If the decision process for letterstrings in the native language (L1) is influenced by knowledge of L2, faster response times for legal words would be expected for related pairs (i.e., priming). Indeed, when comparing groups of learners - each using a different learning method (Experiment 1) - all methods appeared equally effective. Interestingly, when learners used all three methods (Experiment 2), only direct translations and black-and-white pictures resulted in priming. Word-word learning showed the greatest processing advantage (faster retrieval of semantic information), an effect ascribed to the matching learning and testing format. While such learning may not be a solid basis for attaining L2 fluency, this method might help beginning learners construct a basic L2 lexicon, at least orthographically and phonologically, with direct links to L1 vocabulary knowledge. The findings also suggest that task demands associated with in-class learning activities should be carefully considered, especially when testing for acquired knowledge.

Barcroft, Sommers, and Sunderman (Chapter 3) use auditory priming to evaluate two further L2 vocabulary teaching methods (the Keyword method and rote rehearsal). The KEYWORD METHOD involves mediated learning, linking new L2 words (e.g., *dado*, 'dice' in Spanish) with another known L1 word (*Dad*) through the use of mnemonics (e.g., '*Imagine your Dad rolling dice...*', p.56). The orthographic (form) similarity between L2 and L1 words should facilitate lexical access. However, the unrelated L1 words might affect the semantic representations of the L2 vocabulary by forming irrelevant associations. If so, when accessing L2 words acquired using keywords, this irrelevant semantic information may also be accessed, resulting in longer responses. Such a finding, even if an equal or greater number of words are learned, would suggest a difference in the quality of the semantic representations formed compared to those established via rote learning. In the study, L1 primes were related (via the Keyword Method), or were orthographically/ phonologically similar to targets (or not). Learners produced the L2 translation of the target word following the prime (both visually presented). The size of the new vocabulary was similar for both methods, however response times were longer for the Keyword Method and greater the stronger the association between L2 words and their keywords. The authors caution against the Keyword Method

because of the differences in the associated semantic representations that are formed, possibly negatively impacting on the learner's efficiency of lexical access.

Williams and Cheung (Chapter 4) also focused on semantic representations, using variations of semantic priming to determine how (and which) meanings are associated with new L2 vocabulary. They studied the learning of L3 words via L2 (deliberately excluding L1 from the acquisition process), and tested for priming from L3 to L1. Fluent Cantonese-English bilinguals learned French (L3; e.g., *écureuil*) via the English translation (L2; squirrel) or via pictures which, sometimes, also included an associate for the named object (e.g., a squirrel holding a nut). The priming task involved newly learned or known primes in L3, and lexical decisions on targets consisting of L1 words and nonwords. Testing for priming effects in L1 allowed any automatic semantic activation of L3 words to be measured. Interestingly, new L3 words produced semantic priming effects but - if acquired through direct translation - only for direct translations and not associates. When acquired in context (e.g., via complex pictures), they also primed L1 words for the associated items (e.g., nut). Thus newly learned words in another language take on only those aspects of the L1 meaning that were active during the time of learning. Williams and Cheung propose an episodic view of word learning in which the acquisition process, i.e., the form-meaning associations formed, determines the nature of semantic representations in the new language. This account also fits Barcroft et al.'s findings, and one pedagogical implication is that acquiring new vocabulary in varied contexts may result in more nuanced semantic representations.

Nuanced representation with regards to L2 phonology (sounds) is discussed in Chapter 5. Trofimovich and John explore whether mispronunciations of L2 words (e.g., reducing 'three' to 'tree') merely reflect a difficulty in perceiving and pronouncing certain sounds or, more critically, a lack of distinctions at the lexical (word) level. Using auditory priming with direct repetitions (e.g., three/three) and phonologically contrasting words (e.g., three/tree) they show that native speakers do not experience priming for contrasting words but L2 speakers do, suggesting that these items have the same phonological entry in their lexicon. Interestingly, some L2 speakers produced sounds they could not distinguish perceptually, possibly related to more frequent L2 use. Several suggestions are made for targeted classroom activities to help establish a more native-like L2 lexicon, including picture-based listening exercises to foster links between sound and meaning.

Chapter 6 focuses on in-class collaborative teaching activities that involve syntactic priming. Specifically, McDonough explores whether L2 learners use certain syntactic structures more if they have just heard or used them. For example, when pairs of L2 learners

exchange information through questions and answers, primes consisting of fully formed questions containing a verb (e.g., ‘Why do people buy products?’, p.132) are more likely, following a truncated prompt (e.g., ‘what benefits/vitamins’), to generate questions with the same structure (e.g., ‘What benefits do vitamins have?’, p.133). Wh-questions that also included a LEXICAL BOOST (i.e., a verb also used in the prompt) generated a greater use of wh-questions of similar form. Pedagogically, the implications are that properly formed target structures are more likely to be produced with pre-exposure to such structures. How long-lived the syntactic priming effect may be is one of the many future research questions suggested throughout the volume.

The research in Part II uses innovative experimental psycholinguistic methods that, similar to priming, rely on inferences drawn from measured behaviour (i.e., L2 use) following experience with or prior exposure to L2. Segalowitz and Job (Chapter 7) focus on the commonly observed L1 and L2 proficiency differences in L2 speakers. To evaluate one possible account, namely that proficiency differences result from differences in the attentional capacity required to use either language, they exploit an attentional phenomenon, the ATTENTIONAL BLINK (AB). AB occurs when a second appearance of a stimulus, if within 200-500ms, is not noticed. L2 speakers were shown streams of rapidly presented words to determine how efficiently they accessed the words’ lexical representations, and how this impacted differences in L2 proficiency and in language skill (comparing L1 and L2 performance). Counter-intuitively, smaller AB effects occurred for L2, suggesting that the efficiency of lexical access – and not attention - is critical. Lexical access is more efficient in L1 compared to L2, and more efficient in L2 with increased proficiency. Thus two aspects of L2 processing can be distinguished and selectively targeted in L2 learning activities: 1) the efficiency with which meaning is accessed, a skill that can be promoted through activities involving much repetition; and 2) the ability to recruit attention to process accessed meanings, a skill that can be fostered using open-ended activities (e.g., improvisation).

Leeser, Brandl, and Weissglass (Chapter 8) focus on methodology. They consider the impact of a secondary task on on-line L2 processing (e.g., making a grammatical judgement vs. answering a comprehension question). If measures of on-line processing efficiency (e.g., response times) differ depending on the secondary task used to measure performance, inferences about L2 processing must be made with caution. A self-paced reading task revealed that intermediate L2 readers are more attuned to grammatical violations if the secondary task involves grammatical judgements. Interestingly, the type of grammatical violation mattered. For example, L2 learners could detect one type of grammatical violation

but only when asked to make grammatical judgements, not with a secondary comprehension task. This task-induced difference suggests that the grammatical rule tested did not as yet form part of the L2 learners' mental representations. The fact that a task can bias readers towards certain aspects of the stimuli has methodological implications, also for classroom activities.

Hu and Jiang (Chapter 9) focus on L2 listening comprehension ability, where one vital cognitive skill is SEMANTIC INTEGRATION (i.e., the ability to combine lexical and syntactic information with world knowledge). Using cross-modal priming, they compared L2 listening comprehension in L2 learners (Chinese-English speakers) and native English speakers. Sentences were presented auditorily; each final letterstring was presented visually and required a lexical decision. Legal final words either fitted the preceding sentence context or not. Native speakers showed both facilitory and inhibitory effects (for final congruent and incongruent words, respectively). However, L2 learners showed only a facilitory effect, indicating poorer semantic integration ability. Here, one suggested pedagogical approach to foster L2 semantic integration ability involves activities that encourage learners to draw inferences from the sentence context.

In the final experimental chapter (Chapter 10), Sunderman describes an innovative application of the false memory paradigm to explore semantic associations between L2 words in the learner's lexicon and the link with L2 proficiency. On being shown lists of associated L2 words, English L1 speakers learning Spanish were more likely to recall an associated L2 word they had not seen, the greater their L2 proficiency. Thus greater proficiency may be synonymous with a greater ability to activate semantically associated words in L2, evidence of greater conceptual mediation. Interestingly, more proficient L2 learners also performed better in L1, highlighting the link between L1 performance and attention in L2. The findings suggest that, pedagogically, a greater emphasis on L2 production tasks could be beneficial.

The judicious integration of the experimental, theoretical, and pedagogical interface in L2 learning and teaching in this volume facilitates a comprehensive understanding and, hopefully, a greater application of priming methodology in the L2 teaching and learning arena. The resulting advance in our understanding of the cognitive underpinnings of L2 processing and acquisition can only foster more effective L2 learning and teaching methods, thus contributing to more proficient and native-like L2 speakers.

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